

Tracheostomy care

Introduction

Significant numbers of patients with tracheostomies are now being looked after on general wards and doctors need to understand tracheostomy care, complications and the management of emergencies.

What is a tracheostomy?

It is a permanent or temporary opening in the trachea, usually between the second and third tracheal rings (Figure 1). It may be performed electively or as an emergency, and may be done percutaneously or as an open procedure in the operating theatre.

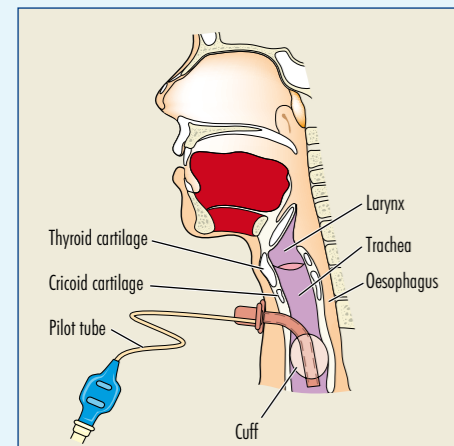
Indications

These include relief of upper airway obstruction (e.g. tumour, postoperative swelling or congenital abnormality; Figure 2), protection of the tracheobronchial tree from aspiration (e.g. reduced level of consciousness), respiratory insufficiency (e.g. pulmonary disease) and long-term weaning from mechanical ventilation following critical illness.

Tracheostomy tubes

There are many different types of tracheostomy tubes available (Figure 3).

Figure 1. Position of a tracheostomy tube.



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Cuffed

Cuffed tubes allow positive pressure ventilation, including continuous positive airway pressure, and protect against aspiration into the lungs.

Cuffed tubes can cause pressure necrosis of the tracheal mucosa. The cuff must be inflated only just enough to prevent an air leak and the pressure must be checked with a manometer to ensure it is <20 mmHg.

Cuffs can also interfere with swallowing and cause difficulties with feeding.

Uncuffed

Uncuffed tubes allow exhaled gas to bypass the tracheostomy and pass through the upper airway, enabling speech.

Uncuffed tubes do not protect against aspiration, and the leak makes positive pressure ventilation difficult. In an emergency a cuffed tube may be required to enable ventilation.

Other features

All tubes come with an obturator which fits in the tube to facilitate insertion. This occludes the tube and must be removed immediately after the tube is in place.

Figure 2. Patient with tracheostomy following surgery for laryngeal tumour.



Figure 3. Different tracheostomy tubes.



Two piece tubes have an inner cannula that can be removed for cleaning. This cannula can be connected to other equipment, e.g. for ventilation. Fenestrated tubes have a hole in the upper aspect of the outer tube to allow air to pass out through the mouth and nose for speech and during weaning. There should always be a non-fenestrated inner tube available should the patient require ventilatory support.

Management of tracheostomies

Tracheostomies bypass the warming, humidification and filtering of the upper airway. This has important consequences.

Stoma care

The wound needs careful cleaning and redressing as appropriate. Soiling with secretions makes infection common.

Cleaning of tubes

The outer tube should be changed once a tract is formed. After that intermittent changing helps prevent infection and formation of crusts that can obstruct the tube.

The inner cannula should be changed at least twice a day and immediately replaced with a clean one.

Humidification

Without humidification, secretions become dry and tenacious, which increases the risk of tube blockage, ciliary dysfunction, atelectasis and lung consolidation.

If the patient is breathing him-/herself in air, a heat/moisture exchanger or a tracheostomy bib will provide humidification. Patients who require oxygen must receive humidified gases.

Saline nebulizers can be used to loosen secretions and it is important that the patient is kept well hydrated.

Suctioning

Patients are often unable to clear secretions and need careful suctioning to prevent atelectasis and airway obstruction (Table 1). This should be done as required using a suction catheter half the diameter of the tracheostomy tube. A sterile catheter is introduced down the tracheostomy and -100 to -120 mmHg (-13 to -15 kPa) suction pressure applied as the catheter is withdrawn.

Changing a tracheostomy tube

Tracheostomy tubes without inner cannulae should be changed every 7–14 days to prevent obstruction by dried secretions. The first tube change is usually undertaken by an anaesthetist because the track from the skin to the trachea may not be fully formed. Tubes with inner cannulae can be left in for up to 4 weeks.

Procedure

1. The patient should be fasted and any nasogastric tube aspirated before a tracheostomy change.
2. The patient should be semi-recumbent with the neck extended, and given 100% oxygen before the procedure.
3. If the track is well established the tube can be removed with suctioning as the cuff is deflated and a new tube inserted with its obturator, which is immediately removed.
4. If difficulty is anticipated, the tube can be changed over a bougie or via a guide wire passing through the obturator.
5. In all cases, a tube one size smaller than the one to be removed must be immediately to hand, as well as tracheal dilators to keep the stoma open (Figure 4). After the tube change, check for equal air entry and any signs of respiratory distress.

Management of blocked or misplaced tube

This is an emergency situation requiring immediate treatment to ensure a patent airway. Signs of a blocked or misplaced tube

Table 1. Complications of tracheostomy

| Early | Haemorrhage Misplacement Pneumothorax Occlusion by cuff herniation |
|---------|--|
| Delayed | Tube blockage with secretions Infection – stoma or bronchial tree Pressure necrosis from cuff Tracheo-oesophageal fistula formation |
| Late | Tracheal granulomata Persistent sinus Tracheal dilatation Tracheal stenosis |

include respiratory distress, tachypnoea, tachycardia and sweating, use of accessory muscles, reduced or absent expired air from tracheostomy tube, and cyanosis.

Treatment

- First, call for help
- Attempt to pass a suction catheter to clear secretions
- Remove the inner cannula, if present, and replace with a new one
- If the tube is still occluded then remove it and replace with a new cuffed tube
- If unable to secure an airway via the tracheal stoma, remove the tracheostomy tube and give oxygen via a face mask
- If inadequate respiratory effort, support with bag valve mask ventilation via the stoma, or mouth with the stoma occluded, and commence cardiopulmonary resuscitation.

Other issues

Swallowing, eating and drinking

Patients with tracheostomies may have swallowing difficulties for a number of reasons. Swallowing should be assessed once the cuff can be deflated, using sterile water and blue dye to check for aspiration. Other clinical markers of aspiration are wet voice, or persistent coughing when eating or drinking. If there is continuing evidence of aspiration the patient should be referred to a speech and language therapist.

Communication

Because airflow bypasses the upper airway, patients with a tracheostomy tube are unable to produce a voice unless an uncuffed or fenestrated tube is used. It is therefore important to provide other

Figure 4. Essential bedside equipment: tracheostomy tube (same size and one size smaller), tracheal dilators, oxygen supply and Ambu bag, 10 ml syringe, suction catheters and source of suction.



means of communication such as pen and paper or cards with useful phrases on. Once the cuff is deflated, the tube can be intermittently occluded or a speaking valve attached to enable speech during exhalation, although this depends on a patent upper airway. Patients who have had a laryngectomy may in time be able to generate speech via a trachea-oesophageal puncture created at the time of surgery.

Weaning

Weaning from a tracheostomy can begin once the primary cause for the tracheostomy has resolved, the respiratory status is stable with oxygen requirement less than 40%, there are adequate swallow, gag and cough reflexes and the patient is well rested, nourished and has had a successful trial of cuff deflation.

Weaning is a gradual process, with the cuff being deflated and the tube being occluded for progressively longer periods.

Decannulation can be considered when the patient is managing several hours without tiring and is able to clear their secretions. They must be monitored closely for 24 hours following decannulation.

Not all patients can be weaned from tracheostomies, e.g. if there is a tumour or the patient is unable to clear secretions. **BJHM**

Conflict of interest: none.

Further reading

- Lewis T, Oliver G (2005) Improving tracheostomy care for ward patients. *Nurs Stand* 19(19): 33–7
- Russell C, Matta B, eds (2004) *Tracheostomy – a Multiprofessional Handbook*. Cambridge University Press, Cambridge
- Serra A (2000) Tracheostomy care. *Nurs Stand* 14(42): 45–52

KEY POINTS

- Tracheostomies are performed for many reasons and may be temporary or permanent.
- A multidisciplinary approach is needed for good care of patients with tracheostomies.
- Understanding the consequences of bypassing the upper airway enables appropriate care and avoidance of complications.
- Essential equipment to manage tube blockage or misplacement should accompany the patient at all times.
- The patient must be given the time and the means to communicate.